

IN THE CLAIMS

1. (Currently Amended) A mirror comprising a multi-layer thin film, wherein said multi-layer thin film comprises a first layer and a second layer,

said first layer has a reflection surface plane,

said second layer has a contact plane with a substrate,

an angle between said reflection surface plane and said contact plane is 45° or equal to an angle between (100) plane orientation and a (111) plane orientation in a silicon crystal, and

said mirror has [[a]] an interior concave portion adjacent to the reflection surface plane which is filled with a non-atmospheric material.

2. (Original) The mirror according to claim 1, wherein said mirror comprises one of a gold film, a lamination film of rhodium film - nickel film - gold film, a lamination film of platinum film - nickel film - gold film, a lamination film of palladium film - nickel film - gold film, a lamination film of gold film - nickel film - gold film, a lamination film of nickel film - boron alloy film - nickel film - gold film, a lamination film of nickel film - gold film, a lamination film of chrome film - nickel film - gold film, a photosensitive polyimide film, a lamination film of gold film - (Ni-P) film/Ni film - P film - Au film, and a lamination film of Au film - Pt film - Au film.

3. (Cancelled)

4. (Currently Amended) The mirror according to claim 1, wherein said non-atmospheric material is one of a resin composition containing an active energy line polymerization initiator and an active energy line reaction resin.

5. (Original) The mirror according to claim 4, wherein said active energy line reaction resin is one of phenol novolak type epoxy resin, cresol/volak type epoxy resin, glycylamine type epoxy

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resin and biphenyl type epoxy resin.

6. (Original) The mirror according to claim 1, wherein said mirror has a shape of a pyramid or a triangular pole, in which both ends are cut down.

7. (Original) The mirror according to claim 6, wherein said reflection surface plane is flat.

8. (Original) The mirror according to claim 6, wherein said reflection surface plane is a curved recess surface.

9. (Original) The mirror according to claim 1, further comprising:

a connection film portion orthogonal to an optical axis.

10. (Currently Amended) A mirror comprising a gold layer, wherein said gold layer has a reflection surface plane and a contact plane,

an angle between said reflection surface plane and said contact plane is 45° or equal to an angle between (100) plane orientation and a (111) plane orientation in a silicon crystal and

said mirror has [[a]] an interior concave portion adjacent to the reflection surface plane which is filled with a non-atmospheric material.

11. (Original) The mirror according to claim 10, wherein said mirror comprises one of said gold film, a lamination film of rhodium film - nickel film - said gold film, a lamination film of platinum film - nickel film - said gold film, a lamination film of palladium film - nickel film - said gold film, a lamination film of gold film - nickel film - said gold film, a lamination film of nickel film - boron alloy film - nickel film - said gold film, a lamination film of nickel film - said gold film, a lamination film of chrome film - nickel film - said gold film, a lamination film of gold film - (Ni-P) film/Ni film - P film - said gold film, and a lamination film of gold film - Pt film - said gold film.

12. (Cancelled)

13. (Currently Amended) The mirror according to claim 10, wherein said non-atmospheric material is one of a resin composition containing an active energy line polymerization initiator and an active energy line reaction resin.
14. (Original) The mirror according to claim 13, wherein said active energy line reaction resin is one of phenol novolak type epoxy resin, cresol/volak type epoxy resin, glycidamine type epoxy resin and biphenyl type epoxy resin.
15. (Original) The mirror according to claim 10, wherein said mirror has a shape of a pyramid or a triangular pole, in which both ends are cut down.
16. (Original) The mirror according to claim 15, wherein said reflection surface plane is flat.
17. (Original) The mirror according to claim 15, wherein said reflection surface plane is a curved recess surface.
18. (Original) The mirror according to claim 10, further comprising:
a connection film portion orthogonal to an optical axis.
19. (Currently Amended) An optical circuit comprising:
a substrate;
an optical fiber or an optical waveguide provided for said substrate;
a photodiode or a surface emission type laser provided for said substrate; and
a mirror connected with said substrate,
wherein said mirror comprises a multi-layer thin film, which comprises a first layer and a second layer,
said first layer is a reflection surface plane, said second layer has a contact plane with a substrate,
an angle between said reflection surface plane and said contact plane is 45° or equal to an

angle between (100) plane orientation and a (111) plane orientation in a silicon crystal and
said mirror has ~~[[a]]~~ an interior concave portion adjacent to the reflection surface plane
which is filled with a non-atmospheric material.

20. (Original) The optical circuit according to claim 19, further comprising:

at least a cantilever of said substrate, wherein said mirror is installed in a tip portion of
said at least a cantilever; and

an expanding and contracting member which moves said tip portion upwardly and
downwardly.

21. (Original) The optical circuit according to claim 20, wherein said expanding and
contracting member is one of a piezoelectric element, an electric distortion actuator, a magnetic
distortion actuator, and a phase transition material.

22. (Original) The optical circuit according to claim 19, wherein said mirror comprises one of
a gold film, a lamination film of rhodium film - nickel film - gold film, a lamination film of
platinum film - nickel film - gold film, a lamination film of palladium film - nickel film - gold
film, a lamination film of gold film - nickel film - gold film, a lamination film of nickel film -
boron alloy film - nickel film - gold film, a lamination film of nickel film - gold film, a
lamination film of chrome film - nickel film - gold film, a photosensitive polyimide film, a
lamination film of gold film - (Ni-P) film/Ni film - P film - Au film, and a lamination film of Au
film - Pt film - Au film.

23. (Cancelled)

24. (Currently Amended) The optical circuit according to claim 19, wherein said non-
atmospheric material is one of a resin composition containing an active energy line
polymerization initiator and an active energy line reaction resin.

25. (Original) The optical circuit according to claim 24, wherein said active energy line reaction resin is one of phenol novolak type epoxy resin, cresol/volak type epoxy resin, glycyclamine type epoxy resin and biphenyl type epoxy resin.
26. (Original) The optical circuit according to claim 19, wherein said mirror has a shape of a pyramid or a triangular pole, in which both ends are cut down.
27. (Original) The optical circuit according to claim 26, wherein said reflection surface plane is flat.
28. (Original) The optical circuit according to claim 26, wherein said reflection surface plane is a curved recess surface.
29. (Original) The optical circuit according to claim 19, further comprising:
a connection film portion orthogonal to an optical axis.
30. (Currently Amended): An optical circuit comprising:
a substrate;
an optical fiber or an optical waveguide provided for said substrate;
a photodiode or a surface emission type laser provided for said substrate; and
a mirror jointed with said substrate,
wherein said mirror comprises a gold layer, which comprises a reflection surface plane and a contact plane,
an angle between said reflection surface plane and said contact plane is 45° or equal to an angle between (100) plane orientation and a (111) plane orientation in a silicon crystal and
said mirror has [[a]] an interior concave portion adjacent to the reflection surface plane
which is filled with a non-atmospheric material.

31. (Original) The optical circuit according to claim 30, further comprising:
at least a cantilever of said substrate, wherein said mirror is installed in a tip portion of said at least a cantilever; and
an expanding and contracting member which moves said tip portion upwardly and downwardly.
32. (Original) The optical circuit according to claim 31, wherein said expanding and contracting member is one of a piezoelectric element, an electric distortion actuator, a magnetic distortion actuator, and a phase transition material.
33. (Original) The optical circuit according to claim 30, wherein said mirror comprises one of a gold film, a lamination film of rhodium film - nickel film - gold film, a lamination film of platinum film - nickel film - gold film, a lamination film of palladium film - nickel film - gold film, a lamination film of gold film - nickel film - gold film, a lamination film of nickel film - boron alloy film - nickel film - gold film, a lamination film of nickel film - gold film, a lamination film of chrome film - nickel film - gold film, a photosensitive polyimide film, a lamination film of gold film - (Ni-P) film/Ni film - P film - Au film, and a lamination film of Au film - Pt film - Au film.
34. (Cancelled)
35. (Currently Amended) The optical circuit according to claim 30, wherein said non-atmospheric material is one of a resin composition containing an active energy line polymerization initiator and an active energy line reaction resin.
36. (Original) The optical circuit according to claim 35, wherein said active energy line reaction resin is one of phenol novolak type epoxy resin, cresol/volak type epoxy resin, glycyclamine type epoxy resin and biphenyl type epoxy resin.

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37. (Original) The optical circuit according to claim 30, wherein said mirror has a shape of a pyramid or a triangular pole, in which both ends are cut down.

38. (Original) The optical circuit according to claim 37, wherein said reflection surface plane is flat.

39. (Original) The optical circuit according to claim 37, wherein said reflection surface plane is a curved recess surface.

40. (Original) The optical circuit according to claim 30, further comprising:
a connection film portion orthogonal to an optical axis.

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